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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/482,060	01/13/2000	David P. Wiczorek	051252-5029	6503

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EXAMINER

KIM, CHRISTOPHER S

ART UNIT	PAPER NUMBER
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3752

DATE MAILED: 04/17/2003

23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/482,060

Applicant(s)

WIECZOREK ET AL.

Examiner

Christopher S. Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 10-19 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) 21-23 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-19 is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 09 December 2002 is: a) ☐ approved b) ☒ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 10, 2003 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Drawings

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on September 13, 2002 have been disapproved because they introduce new matter into the drawings. 37 CFR 1.121(a)(6) states that no amendment may introduce new matter into the disclosure of an application. Newly presented figures 4A and 4B appear to be hand drawn copies of figures 3 and 4 of U.S. Patent 5,875,972. Claim 10 recites "at least one slot extending tangentially from the at least one fuel passage to the central aperture." Newly presented figures 4A and 4B appear to show at least one slot 100 extending radial from the at least one fuel passage 94."

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4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "generally constant cross-section between an outer perimeter and a central aperture" recited in claim 1; the "at least one slot extending tangentially from the at least one fuel passage opening to the central aperture" recited in claim 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. Claims 1 and 2 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites "a swirl generator approximate the seat and having a generally constant cross-section between an outer perimeter and a central aperture" in line 11-12. The specification discloses, on page 6, lines 23-24, "swirl generator, as shown in Fig. 1, includes a pair of flat disks, a guide disk 86 and a swirl disk 88." The swirl generator (elements 86 and 88) do not appear to have a constant cross-section as evidenced by figures 2A and 2B.

Claim Rejections - 35 USC § 103

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6. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daley et al. (4,971,254).

With respect to claim 1, Daley et al. discloses a fuel injector having a fuel inlet 14; a fuel outlet 12; a body 10; an armature (inherent); a cylindrical needle 16; a seat 20; a swirl generator 18. Daley et al. does not disclose the swirl generator having a guiding member contiguous to a flat disk. Forming the swirl generator of two elements (such as the disc member 22 and retainer member 24 of Daley et al.) is a mere separation of parts. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the swirl generator of Daley et al. from two elements (two flat disk like elements) to ease manufacturing, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

The function recitation "when the body is exposed to operating temperatures of a cylinder of an engine" is not a positively cited limitation which only requires the ability to so perform. As applicant has clarified in the response filed on October 5, 2001, applicant is not claiming a cylinder of an engine.

Daly et al. is silent as to being a direct or indirect fuel injector. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have applied the teachings of Daly et al. to a direct injection fuel injector to increase the divergence of the column of fuel.

With respect to claim 2, Daly et al. discloses the limitations of the claimed invention with the exception of the range of the inner and outer diameter of the

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cylindrical annulus. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have made the inner diameter of the cylindrical annulus no more than 50% greater than the diameter of the cylindrical needle and the outer diameter of the cylindrical annulus no less than 100% greater than the inner diameter of the cylindrical annulus, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. Claims 3-5 (as best understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Wieczorek (4,967,959) in view of Muller et al. (6,145,761).

With respect to claims 3-5, Wieczorek discloses a fuel injector (also see Hensley, US Patent 4,610,080 per Wieczorek column 1, lines 61-62) comprising: a body 24 (4,610,080); an armature 26 (4,610,080); a cylindrical needle 12; a seat 14; a first surface (22 and surface of seat 14 in contact with member 26); a second surface 24a; a third surface (external bottom of seat member 14); and a cut-out configuration 34. Wieczorek discloses a guide member 26 but does not disclose a swirl generator.

Muller et al. disclose a direct injection fuel injector comprising a swirl generator having a guide member 35 contiguous to a flat disk 47. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have replaced the guide member of Wieczorek with the swirl generator/guide member of Muller et al. to increase the divergence of the column of fuel.

Additionally, Wieczorek and Hensley appear to disclose a body of plastic material. Muller et al. discloses a body 21 of metallic material. It would have been

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obvious to a person having ordinary skill in the art at the time of the invention to have made the body of Wieczorek from metallic material as taught by Muller et al. for increased strength and durability.

The function recitation "when the body is exposed to operating temperatures of a cylinder of an engine" is not a positively cited limitation which only requires the ability to so perform. As applicant has clarified in the response filed on October 5, 2001, applicant is not claiming a cylinder of an engine.

Allowable Subject Matter

8. Claims 10-19 are allowed.

Response to Arguments

9. Applicant's arguments filed March 10, 2003 have been fully considered but they are not persuasive.

In response to applicant's argument that one would not make the swirl generator of Daly et al. to have a constant cross section, as indicated above, applicant's claim 1 defines the swirl generator to include the flat disk and the guide disk. Applicant's swirl generator does not appear to have a constant cross-section between an outer perimeter and a central aperture. See applicant's figure 2A and 2B.

In response to applicant's argument that there is no motivation or teaching to make the swirl generator of Daly et al. from two elements, since it has been held that constructing a formerly integral structure in various elements involves only routine skill

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in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it is knowledge available to one of ordinary skill in the art that making the swirl generator of Daley et al. from multiple elements reduces complex machining and eases manufacturing.

In response to applicant's argument that Daly indicates a plastic body by sectional legend, Daley does not limit nor particularly distinguish the material of the fuel injector. Although portions of the cross hatching may appear to represent plastic, other section of the same cross-hatching (Fig. 2) indicates metal. Metal fuel injectors are well known in that art as evidenced by Müller et al. (see cross hatching of Müller et al.)

In response to applicant's argument that the functional recitation is a positively recited feature that must be considered, applicant indicated in the response filed on October 5, 2001, "it is clear that the cylinder and engine are not being claimed in combination with the fuel injector." Therefore, the function recitation "when the body is exposed to operating temperatures of a cylinder of an engine" has been given patentable weight to the extent that it mere requires the ability to so perform.

In response to applicant's argument that teachings from a direct fuel injector cannot be combined into an indirect fuel injector, Kelly (5,947,382) provides that one of

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ordinary skill in the art will readily appreciate applying fuel injector teachings to both direct and indirect fuel injectors (column, 4, lines 50-58).

In response to applicant's argument the swirl generator of Wieczorek is not contiguous to the first surface of the seat, Wieczorek discloses a first surface (22 and surface of seat 14 in contact with member 26) contiguous with the member 26.

In response to applicant's argument that the combination of Wieczorek and Muller et al. could obstruct the particle trap of well 34, the guide member 26 of Wieczorek has a flat lower surface. The swirl generator of Muller et al. also has a flat lower surface. Thus, the well 34 of Wieczorek will be maintained.

In response to applicant's argument that there is no motivation to combine the teachings of Muller et al. to the device of Wieczorek, it is knowledge available to one of ordinary skill in the art that a swirl generator swirls the fuel imparting centrifugal force to the spray column which increases the divergence of the column of fuel.

In response to applicant's argument that newly represented figures 4A and 4B are supported by US Patent 5,875,972 which have been incorporated by reference, the figures show a radial passage rather than a tangentially extending passage.

In response to applicant's argument that applicant is prepared to show a constant cross section, applicant is encouraged to do so. Such a showing would appear to be new matter. The application as originally filed does not disclose any part of central aperture 92 of the guide disk 86 having a diameter equal to the diameter of central aperture 92 of the swirl disk 88. In fact, US Patent 5,875,972 shows a central aperture 63 of disk 46 and a central aperture 62 of disk 44. Additionally, it appears that, if

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possible at all, the only way to show a constant cross section is to show a cross section along an irregular line (rather than a straight line) cutting through the swirl generator.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher S. Kim whose telephone number is (703) 308-8336. The examiner can normally be reached on Monday - Thursday, 6:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Y. Mar can be reached on (703) 308-2087. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.


Christopher S. Kim
Examiner
Art Unit 3752

CK
April 15, 2003